

Notice of Allowability

Application No.

09/622,734

Examiner

Johannes P Mondt

Applicant(s)

KOGA, KEISUKE

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/26/04.
2. ☒ The allowed claim(s) is/are 1-7 and 9-22.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 5/22/2002.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/26/2004 has been entered.

Response to Amendment

Amendment After Final filed 04/28/2004 has been entered in view of aforementioned Request for Continued Examination. In said Amendment Applicant amended claims 5 and 16 through amendment of claim 5. Said Amendment forms the basis of this Official Action.

REASONS FOR ALLOWANCE

Claims 1-7 and 9-22 are allowed.

2. The following is an examiner's statement of reasons for allowance:

(a) With regard to claims 1-3 and 14:

Kojima specifically teaches that "the source region to be symmetrical in structure with its associated drain region" (column 12, lines 19-27). Motivation to include the teaching by Kojima in the invention by Kuriyama is provided by the analogue of the intermediate gate electrode 105 (column 9, line 4) in the form of extraction electrode 2: reduction of the influence of the capacitance between said

extraction electrode 2 in Kuriyama, - corresponding to the intermediate gate electrode 105 in Kojima, and the corresponding drain 103 is the primary motivation (see column 12, lines 19-27). However, it does not necessarily follow from the above that within the drain region itself both wells must have *"impurity concentrations having symmetrical impurity distributions"*, because the symmetry taught literally by Kojima is confined to inter-source-drain symmetry, not intra-drain symmetry. The rejection of claim 1 and dependent claims is therefore withdrawn. After an update of the search, taking into account the broader language of the currently amended claim 1, claims 1-3 and 14 (dependent upon claim 1) are herewith indicated as allowed.

(b) With regard to claims 4 and 15:

The limitation "a part of the gate electrode is provided in such a manner as to cover an end of the drain region" is not met by Kuriyama et al (5,550,435), because region 4 in Kuriyama et al (cf. Figure 4) is identified as a channel region rather than a portion of the drain region (cf. column 4, lines 34-48) while the drain region portion of the substrate is exclusively formed by that portion of region 6 that is directly under emitter 1 (see column 4, lines 47-48 in Kuriyama). No other art has been found.

(c) With regard to claims 5, 6 and 16:

In Kuriyama et al no thermal silicon oxide gate insulation film as a layer separate from the "first insulating film" is taught, counter to Figure 4 of Applicant's disclosure, in which separate layers 46 and 47 are shown. Said separate layers are claimed respectively as the "gate insulating film formed by thermal oxidation of silicon" and "first

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insulating film" in claim 5 (see Specification, Figure 4 and pages 36-38 for disclosure by Applicant). No motivation appears to be possible to include a teaching of a separate insulating film in the invention by Kuriyama et al in view of the material constitution of the first insulating film 3, which is taught to be made of SiO₂ (cf. col. 4, l. 39, e.g.).

(d) With regard to claims 7 and 17:

Shielding electrodes in the art of field emission type electron sources with field effect transistor and made of the same material as the gate electrode, are known in the prior art as witnessed by *Ishikawa et al (JP60124872)*. However, although this teaching would be pertinent to the MOSFET aspect of the invention by Kuriyama et al, said shielding electrode by *Ishikawa et al* (a) is not held at the same potential as the substrate, and (b) is neither shown nor described to cover a region of the channel. Shielding electrodes with the additional two features (a) and (b) described above have not been found in the Prior Art to date, nor has any reason surfaced as to why such shielding electrodes should be obvious.

(e) With regard to claims 9-13 and 18-22:

Although the first portion of claim 9 is taught by Kuriyama, i.e., up to and including line 14 on page 67 of the claim as printed in the disclosure, Kuriyama et al do not teach the further limitation for the drain region (lines 15-18), nor the further limitation for the gate electrode (lines 19-22), the latter with the exception that the gate electrode 8 is positioned lower than the extraction electrode 2, which is taught by Kuriyama et al (see discussion of claim 1). Although Shimomura et al is valid art under 102(a) unless the earliest of the two foreign priority documents is perfected, and although Shimomura

et al teach within the context of a MOSFET that the drain 2 should be surrounded by the source region 3 (Figure 1 and page 9, Embodiment 1), and although the teaching by Shimomura et al further includes a symmetrical placement of the gate with respect to the *drain*, both teachings being motivated by the reduction of electric noise through fluctuations particularly for high-frequency applications (cf. abstract and page 6, line 57 – page 7, line 19 and page 8, lines 5-19), no teaching of a similar nature with regard to a symmetrical placement of the gate with respect to the emission cathode in a field effect device is available. The same comment applies to claim 18, which is taught by Kuriyama et al up to and including line 14 on page 5 of Amendment C, while, with the exception of the teaching by Kuriyama et al of the positioning of the gate electrode at a location lower than the extraction electrode, the further limitations on the drain region of the field effect transistor portion and on the gate electrode of the field effect transistor portion are identical to those in claim 9, and hence the same comment applies to the close but incomplete teaching by Shimomura et al in this regard.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM
June 26, 2004